CLAIMS

1. A hydro-generator plant comprising at least one rotating electric machine (100) for high voltage, in which the generator is coupled to a turbine (102) via shaft means (101), said generator (100) comprising at least one winding, characterized in that the generator (100) is provided with solid insulation and in that each winding is arranged to be directly connected via coupling elements (109) to a transmission or distribution network (110) having a voltage of between 20 and 800 kV, preferably higher than 36 kV.

2. A plant as claimed in claim 1, characterized in that the winding includes an insulation system comprising at least two semiconducting layers, each layer constituting essentially an equipotential surface, and also intermediate solid insulation wherein at least one of the layers has substantially the same coefficient of thermal expansion as the solid insulation.

3. A plant as claimed in either of claims 1 or 2, characterized in that the generator comprises a magnetic circuit with a magnetic core.

4. A plant as claimed in claim 3, characterized in that the flux paths in the core of the magnetic circuit consist of laminated sheet and/or cast iron and/or powder-based iron, and/or rough forge iron.

5. A plant as claimed in any of claims 1-4, characterized in that the solid insulation is built up of a cable (6) intended for high voltage comprising one or more current-carrying conductors (31) surrounded by at least two semiconducting layers (32, 34) and intermediate insulating layers (33) of solid insulation.

6. A plant as claimed in claim 5, characterized in that the innermost semiconducting layer (32) is at substantially the same potential as the conductor(s) (31).

7. A plant as claimed in either claim 5 or claim 6, characterized in that one of the outer semiconducting layers (34) is arranged to form essentially an equipotential surface surrounding the conductor(s) (31).

8. A plant as claimed in claim 7, characterized in that said outer semiconducting layer (34) is connected to a predefined potential.

9. A plant as claimed in claim 8, ~~characterized in that~~ wherein the predefined potential is earth potential.

10. A plant as claimed in any of claims 5-9, characterized in that at least two of said layers have substantially the same coefficient of thermal expansion.

11. A plant as claimed in any of claims 5-7, characterized in that the current-carrying conductor comprises a plurality of strands, only a few of the strands being uninsulated from each other.

12. A plant as claimed in any of claims 1-11, characterized in that the winding consists of a cable comprising one or more current-carrying conductors (2), each conductor consisting of a number of strands, an inner semiconducting layer (3) being arranged around each conductor, an insulating layer (4) of solid insulation being arranged around each inner semiconducting layer (3) and an outer semiconducting layer (5) being arranged around each insulating layer (4).

13. The plant as claimed in claim 12, ~~characterized in that~~ wherein the cable also comprises a metal screen and a sheath.

14. A plant as claimed in any of the preceding claims, characterized in that its stator (1) is cooled at earth potential by means of a flow of gas and/or liquid.

15. A plant as claimed in any of the preceding claims, characterized in that the outermost semi-conductor (34) is connected to earth potential.

16. A plant as claimed in any of the preceding claims, characterized in that the rotor (2) is inductively connected to the high voltage.

17. The plant as claimed in claim 16, ~~characterized in that~~ wherein the rotor ~~(2)~~ is cylindrical in shape, has salient poles and also has a constant air gap.

18. A plant as claimed in claim 17, ~~characterized in that~~ wherein the stator winding is carried out with integral slot ~~winding~~.

19. ~~A plant as claimed in claim 17, characterized in that~~ wherein the stator winding is carried out with fractional slot ~~winding~~.

20. A plant as claimed in claim ~~18~~ or claim 19, ~~characterized in that~~ the stator has concentrated winding

and that coils in the winding have a coil span equal to the pole pitch.

21. A plant as claimed in claim 18 or claim 19, characterized in that the coils in the stator winding are distributed and have a coil span different from the pole pitch.

22. A plant as claimed in any of claims 5-21, characterized in that the cables (6) with solid insulation have a conductor area of between 40 and 3000 mm^2 and have an outer cable diameter of between 20 and 250 mm.

23. A plant as claimed in claim 22, characterized in that the cable (6) is cooled by gas or liquid inside the current-carrying conductors (31).

24. A plant as claimed in any of the preceding claims, characterized in that the electric generator (100) is designed for high voltage and arranged to supply the out-going electric network (110) directly without any intermediate connection of a transformer.

25. A plant as claimed in any of the preceding claims, characterized in that it comprises several generators, each of which lacks an individual step-up transformer, but which, via a system transformer common to the generators, is connected to the transmission or distribution network.

26. A plant as claimed in claim 24, characterized in that at least one generator (100) is earthed via an impedance (103).

~~27. (A) plant as claimed in claim 24, characterized in that~~ wherein at least one generator ~~(100)~~ is directly earthed.

28. (A) plant as claimed in any of claims 24-27, characterized in that it is designed to be driven alternatively as pump and turbine station, the electric machine (100) being arranged to function as motor driven directly from the electric power network (110) or as generator generating voltage for the electric power network.

~~29. (A) plant as claimed claim 24, characterized in that~~ wherein the generator is arranged to generate power to various voltage levels.

30. A plant as claimed claim 29, characterized in that one of said voltage levels is arranged to generate auxiliary power and that the auxiliary power is arranged to be generated from a separate winding (119;113) in the generator (100).

31. A plant as claimed in any of claims 1-30, characterized in that all components are earthed to the same earth system.

32. A plant as claimed in any of the preceding claims, characterized in that the winding of the generator is arranged for self-regulating field control and lacks auxiliary means for control of the field.

33. Procedure for constructing a plant as claimed in any of claims 1-32, characterized in that the stator of the generator is delivered in parts to the plant site, said parts comprising separate stator laminations and/or combined stacks of stator laminations, after which said parts are assembled on site, and in that both threading of the winding and any splicing required are performed on site.

34. An electric generator (100) for high voltage included in a hydro-generator plant in which the generator is coupled to a turbine (102) via shaft means (101), said generator (100) comprising at least one winding, characterized in that the generator (100) is provided with solid insulation and in that each winding is arranged to be directly connected via coupling elements (109) to a transmission or distribution network (110) having a voltage of between 20 and 800 kV, preferably higher than 36 kV.

35. A generator as claimed in claim 34, characterized in that it includes the features defined for the generator included in the plant as claimed in any of claims 2-32.

36. A procedure for manufacturing a generator as claimed in claim 34 or 35, characterized in that said manufacture includes the measures for assembly of the generator which are defined in claim 33.